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US FISCAL DYNAMICS IN POLITICAL PERSPECTIVE

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Abstract

Given the importance of fiscal balance for ensuring a sustainable fiscal policy, we conduct an empirical examination of fiscal dynamics in the United States in response to unsustainable budget deviations. We concentrate on the role of political factors, namely the Republican - Democrat presidential divide, in determining the fiscal response to budget disequilibria. Making use of an asymmetric cointegration framework, we explore politically motivated fiscal asymmetries in the US, from Eisenhower to Obama. We conclude that political factors such as the government's political quadrant and the timing of elections are important determinants of the fiscal response to unsustainable budget deviations.

Keywords: Fiscal, Political, Cointegration, Asymmetric

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1. Introduction

Fiscal policy is, alongside monetary policy, a central macroeconomic tool, allowing for counter-cyclical policies that minimize business cycles and thus partially insure against economic instability. The efficient and sensible use of this macroeconomic artifice requires the maintenance of a sustainable fiscal balance. This work project explores how is fiscal balance recovered and the role of political factors in this process, in the case of the US.

Focusing on the political dimension of fiscal policy and its impact on fiscal aggregate behaviour, we explore possible political asymmetric fiscal responses to budget deviations. This political bias has been explored in the economic literature, having been identified as an important element in non-linear fiscal dynamics.

Empirical studies of fiscal dynamics tend to assume a benevolent, non-partisan, and non-opportunistic policy-maker. This ignores the fact that political ideologies and the timing of elections may affect the government's political priorities and, hence, fiscal behaviour. Taking political factors as determinants of fiscal asymmetries is a relevant addition to the existing literature on US fiscal policy.

Analysing fiscal aggregates' behaviour from Eisenhower to Obama's administration, we conclude that political factors such as the government's political quadrant and the timing of elections are significant determinants of the fiscal aggregates' response to unsustainable budget deviations.

This work project is organized as follows. Section 2 reviews the academic literature. Section 3 presents the methodology adopted. Section 4 presents the data. Section 5 summarizes the econometric estimation and Section 6 presents the results. Section 7 concludes.

2. Literature Review

Hibbs (1977) first proposed a Partisan Theory of economic policy, whereby political parties' macroeconomic policies derive from their constituencies' preferences. Leftist parties would tend to focus on lowering unemployment, whereas right-wing parties prioritize low inflation. Policies by left and right would accommodate labor and business interests, respectively. To promote employment, leftist parties would tend to increase public spending. Rightist parties, on the other hand, would pursue stricter fiscal discipline with a view to keep inflation in check.

In addition to the Partisan Theory, two additional strands of the literature suggest political economy determinants of fiscal dynamics. First, Nordhaus' (1975) Political Business Cycle Theory assumes that the Incumbent looks forward to coming elections and adjusts economic policy in an opportunistic way, so to maximize the chances of re-election. A cycle may emerge with the Incumbent "*starting with relative austerity in early years and ending with the spending potlatch right before elections*". Another strand of the literature, put forward in Persson and Svensson (1989) advocate that conservative governments drive up public deficits as a way to constrain future spending by leftist cabinets. According to the authors, a conservative government expecting to be substituted by a government in favour of higher public spending can postpone fiscal adjustments or expand fiscal deficit, so as to limit the fiscal policy of the next government. In parallel, Alesina and Tabellini (1990) conclude that government debt can also be used as a strategic variable by opposing policymakers. Aiming dissimilar public goods, policymakers will be inclined to influence its successor fiscal policy through government debt.

Several authors have empirically explored this theoretical link between left-wing and public spending. Cameron (1978) tackles the "*expansion of the role of government in the distribution and consumption of national income*", identifying a clear partisan effect where

the partisanship of the government determines the rate of expansion of the public economy, with left-wing parties associated with higher rate of growth of both spending and taxation. Volkerink and de Haan (2001) analyse public deficits in a political economy perspective. According to the authors, left-wing parties do not indulge in larger public deficits, as they tend to accompany higher spending with higher taxation, as concluded by Cameron. Mulas-Granados (2003) and Tavares (2004) study the political economy of fiscal adjustments. Mulas-Granados concludes that leftist governments tended to increase public spending between 1970 to 1994 and, in the years when fiscal adjustments became necessary, they resorted mostly to increases in taxation. Tavares showed that leftist governments rely mostly on taxation for adjustments, while rightist governments rely primarily on spending cuts. Tavares concludes that expenditure based adjustments pursued by leftist governments tend to be more successful.

Motivated by the theoretical and empirical literature, we explore the impact of the political quadrant of the federal government and the timing of elections on fiscal balance in the US. Fiscal policy choices are eventually constrained by an intertemporal budget constraint. How is fiscal balance redressed after a deviation? Which fiscal aggregates, and in what direction, move to redress it? Does the party in power affect that response? What is the influence of elections on the Incumbent's policies, and is that influence different depending on the political quadrant in power?

According to the literature, there are four ways to regain fiscal balance. Firstly the tax-spend hypothesis, with two directions of causality suggested. Buchanan and Wagner (1977) advocate that an increase in taxes results in the perception by the public of the real price of expenditure and a consequent decrease in spending. In the opposite direction, Friedman (1978) suggests that, in a fiscal adjustment setting, an increase in taxes will result in an expansion of expenditure.

Subsequently, the spend-tax hypothesis proposed by Barro (1979) - In a ricardian equivalence setting, expenditure today implies higher taxes tomorrow. Next, the fiscal synchronization hypothesis proposed by Meltzer and Richard (1981) - Taxes and expenditure are synchronously decided. Finally, the institutional separation hypothesis proposed by Wildavsky (1988), where each fiscal aggregate is independent from the homologous.

Empirically, Payne (2003) surveys the tax-spend literature and uncovers a wide discrepancy across results for the United States that rely on tests of Granger-causality. Miller and Russek (1989) introduced cointegration, allowing for short and long-run horizons. They still come across substantial inconsistency. Given the variety of results, researchers allowed for non-linearities in the behaviour of fiscal aggregates. Arestis, Cipollini and Fattouh (2004) relaxed the assumption of symmetric adjustments and, resorting to TAR and MTAR techniques, constructed an asymmetric cointegration model. The main conclusion is the identification of a soft budget constraint, whereby fiscal aggregates respond significantly to deficit-enhancing deviations only after a given threshold has been passed. Ewing et al. (2006) and Cipollini, Fattouh and Mouratidis (2009) also undertook an exploration of non-linear fiscal responses, confirming that expenditure and taxes only respond to budgetary disequilibria above a given threshold. Young (2011) introduces an asymmetric linear model approach, assuming a priori asymmetries. In contrast with common non-linear studies, Young finds a significant short-run causal relationship between tax and expenditure, more specifically positive responses of expenditure to increases in taxes.

Expanding the non-linear analysis of fiscal dynamics, we explore how political asymmetries related to partisanship and the timing of elections affect fiscal responses to budget disequilibria.

3. Methodology

Recently, Kollias, Papadamou and Psarianos (2014) have explored asymmetric UK fiscal dynamics, differentiating between Labour and Conservatives. The authors concluded that “*Conservative Governments invariably tend to operate under a hard budget constraint, exhibiting a stronger fiscal vigilance vis-à-vis Labour administrations*”. We follow the methodology in Kollias et al., modelling US fiscal dynamics as an asymmetric process, sensitive to partisan and electoral motivations.

Firstly, following the fiscal dynamics literature, we model the US fiscal aggregates in a Vector Error Correction Model (VECM), allowing for a simultaneous exploration of short and long run dynamics:

$$\begin{aligned} Y_t &= c + \beta_1 Y_{t-1} + \dots + \beta_i Y_{t-i} + e_{t-1} + \varepsilon_t, \quad Y_t = \begin{pmatrix} \Delta T_t \\ \Delta G_t \end{pmatrix} \\ T_t &= c + \beta_2 G_t + e_{t-1} \quad \Leftrightarrow \quad e_{t-1} = T_t - \beta_2 G_t - c \end{aligned} \tag{1}$$

In our models the Error Correction Term (ECT), e_{t-1} , represents deviations from a linear combination of $Y_t = [T_t \ G_t]$, that departs from a long-run equation where $\beta_2 = 1$. Following Legrenzi and Milas (2012), we model the cointegration relation as an estimate for a sustainable balance, the ECT thus representing deviations from a sustainable balance¹ - positive ECTs represent surplus-enhancing deviations while negative ECTs represent deficit-enhancing deviances. From such a specification our analysis focuses on the adjustment coefficients present in each VECM, representing the fiscal aggregates response to deviations from a long run sustainable balance equilibrium.

Firstly, motivated by Ewing et al.’s (2006) a priori foundation for modelling asymmetrical fiscal responses to disequilibrium- “*fiscal policymakers may respond differently to a deviation of the deficit or surplus from its long-run trend*” - we follow Kollias et al.

¹ According to Quintos (1995), with $\beta_2 = 1$ we have strong sustainability in the fiscal balance with receipts accompanying fully expenditure. With $0 < \beta_2 < 1$, we have expenditure expanding at a higher rate than receipts, incurring in weak sustainability debt marketing by the federal state being challenged.

(2014) by allowing politically motivated fiscal asymmetry. Assuming that Democrats and Republicans react differently to departures from a balanced budget, we estimate a VECM where the ECT is interacted with a political dummy which signals Democrat and Republican administrations:

$$Y_t = c + \beta_1 Y_{t-1} + \dots + \beta_i Y_{t-i} + Dem. e_{t-1} + Rep. e_{t-1} + \varepsilon_t \quad (2)$$

$$Dem \begin{cases} 1, Democrat Administration \\ 0, Republican Administration \end{cases} \text{ and } Rep = (1 - Dem)$$

Secondly, we explore an asymmetry of signal that can change with the political quadrant of the government. For this we separate the ECT in two regimes – a surplus-enhancing regime, focusing only on positive values of the ECT and a deficit-enhancing regime, with negative values of the ECT. Both regimes are then differentiated into Democrat and Republican observations with the interaction of both ECTs with a political dummy:

$$Y_t = c + \beta_1 Y_{t-1} + \dots + \beta_i Y_{t-i} + Dem. e_{t-1}^+ + Rep. e_{t-1}^+ + Dem. e_{t-1}^- + Rep. e_{t-1}^- + \varepsilon_t \quad (3)$$

Next, having in mind that responses to budget disequilibrium may originate endogenously or exogenously, that is, automatically or discretionarily, we expand the Kollias et al. framework with an exogenous dummy that distinguishes fiscal responses from discretionary and automatic, differentiating between Democrats and Republicans:

$$Y_t = c + \beta_1 Y_{t-1} + \dots + \beta_i Y_{t-i} + Dem. e_{t-1}^{Ex} + Rep. e_{t-1}^{Ex} + Dem. e_{t-1}^{En} + Rep. e_{t-1}^{En} + \varepsilon_t \quad (4)$$

By interacting the ECT with an exogenous dummy we signal discretionary fiscal responses to budget disequilibrium, allowing us to estimate separately automatic and

discretionary fiscal responses. The motivation for such fiscal response discrimination is the narrative approach developed in the fiscal multipliers literature, characterized by a pre-identification of spending and revenue changes and a post-analysis of the effects of such episodes² on Output.

Subsequently, motivated by the main conclusion of non-linear literature, that is, fiscal aggregates only respond significantly to deficit-enhancing deviations above a given threshold, we interact the ECT with a dimension dummy. Dividing the ECT into unusually large and normal budget deviations, we are able to estimate fiscal responses to large and normally dimensioned budget disequilibria. Both regimes are also politically differentiated, following Kollias et. al:

$$Y_t = c + \beta_1 Y_{t-1} + \dots + \beta_i Y_{t-i} + Dem. e_{t-1}^{Un} + Rep. e_{t-1}^{Un} + Dem. e_{t-1}^{Us} + Rep. e_{t-1}^{Us} + \varepsilon_t \quad (5)$$

After, following Nordhaus, we focus on electoral motivated changes in fiscal dynamics. Assuming that Democrats and Republicans may react differently to budget deviations in electoral and non-electoral periods, we interact the ECT with an election dummy that signals a pre-election period totalling 5 quarters. A partisan differentiation is again present in the model:

$$Y_t = c + \beta_1 Y_{t-1} + \dots + \beta_i Y_{t-i} + Dem. e_{t-1}^{El} + Rep. e_{t-1}^{El} + Dem. e_{t-1}^{Ne} + Rep. e_{t-1}^{Ne} + \varepsilon_t \quad (6)$$

Finally, to assess if policymakers in the US follow a Persson and Svensson/Alesina and Tabellini hypothesis, that is, if Democrats and Republicans strategically alter their

² See Ramey and Shapiro (1998), Edelberg et. al (1999), Eichenbaum and Fisher (2004) and, more recently, Romer and Romer (2010) and Ramey (2011).

response to budget disequilibria when in trigger-elections³, we interact the ECT with a trigger-election dummy that signals a pre-election period of 5 quarters:

$$Y_t = c + \beta_1 Y_{t-1} + \dots + \beta_i Y_{t-i} + Dem. e_{t-1}^{T-El} + Rep. e_{t-1}^{T-El} + Dem. e_{t-1}^{Nte} + Rep. e_{t-1}^{Nte} + \varepsilon_t \quad (7)$$

We thus explore six strands of asymmetries: (1) partisan asymmetry, (2) signal asymmetry, (3) exogenous asymmetry, (4) dimension asymmetry, (5) election asymmetry and (6) trigger-election asymmetry. All six models are estimated with and without partisan differentiation, for comparison purposes thus being initially estimated 12 models.

For analysis purposes, we estimate for Models 5 and 6 expanded frameworks where adding to election asymmetries we also assume signal asymmetry:

$$Y_t = c + \beta_1 Y_{t-1} + \dots + \beta_i Y_{t-i} + Dem^+. e_{t-1}^{El} + Rep^+. e_{t-1}^{El} + Dem^-. e_{t-1}^{El} + Rep^-. e_{t-1}^{El} + Dem^+. e_{t-1}^{Ne} + Rep^+. e_{t-1}^{Ne} + Dem^-. e_{t-1}^{Ne} + Rep^-. e_{t-1}^{Ne} + \varepsilon_t \quad (8)$$

4. Data

Our empirical analysis on US fiscal outcomes focuses on federal expenditure and receipts. Being quarterly series, from 1952:Q1 to 2015:Q2, each quarter refers to the calendar year, all variables being transformed into natural logarithms.

Both series are seasonally adjusted at annual rates from the source⁴. For simplification purposes, both are deflated with the US GDP implicit deflator, obtained from the Federal

³ Elections where there is a shift in the political quadrant of the government.

⁴ Seasonal adjustment being performed at the source refers to adjustment technics such as X-12 and X-13 ARIMA methods, official seasonal adjustment technics from the Bureau of Economic Analysis.

Reserve Economic Research (FRED), and divided by the US population presented with a quarterly frequency in BEA⁵, to reach federal government expenditure and receipts per capita.

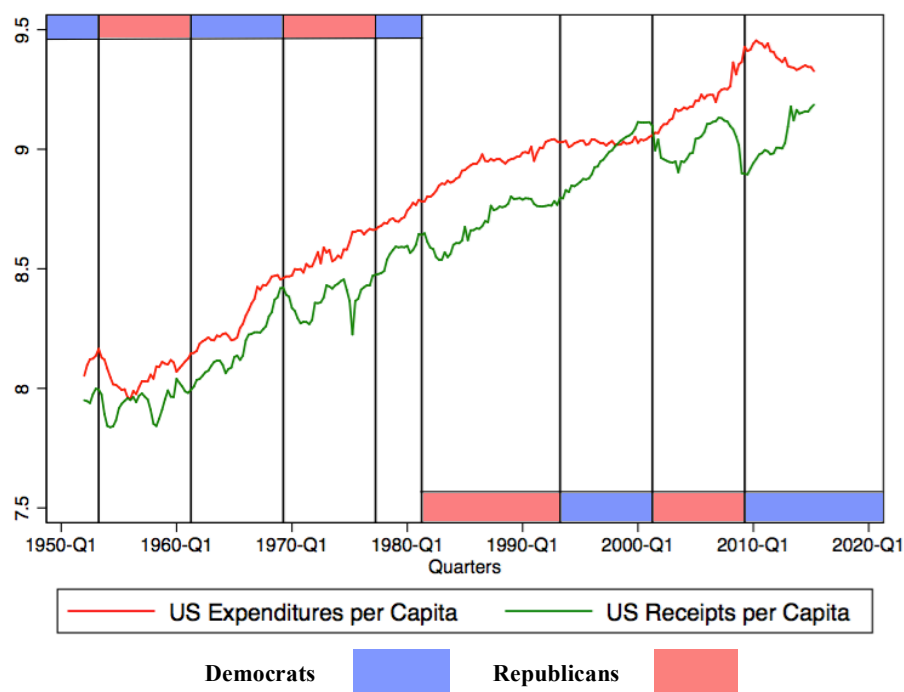


Figure 1. US Expenditures and Receipts per Capita, 1952:Q1 to 2015:Q2

Focusing on federal expenditure, to assess all spending dynamics which affect the federal budget we focus on Line 42 of the National Income and Product Accounts Table 3.2, that is, Total Federal Expenditures. Federal receipts, as federal expenditure, are original from BEA. Extracted also from NIPA Table 3.2, this variable refers to Line 39, Total Federal Receipts.

Methodologically, we recur to six dummy variables that aim to capture dissimilar types of fiscal response asymmetries⁶:

- (1) **Political Dummy**: This variable signals the quadrant of the federal administration in power, if Democrat (=1) or Republican (=0). We assume that

⁵ Extracted from NIPA's Table 2.1, Line 40, according to BEA being the series used to compute quarterly per capita variables.

⁶ See Technical Appendix, Figures 2-7, for a graphical representation of the described variables in interaction with the ECT.

there is an institutional lag after elections, the elected government assuming full office in the second quarter after elections⁷.

- (2) **Signal Dummy:** Focused on the ECT signal, if positive (=1) or if negative (=0).
- (3) **Exogenous Dummy:** Constructed with both Romer and Romer's (2010) identified tax episodes and Ramey's (2011) expenditure episodes, it focuses on the character of each fiscal response. Unlike the remaining dummy variables, the exogenous dummy is available only until 2013:Q4⁸. There is no discrimination between tax and expenditure changes as this variable focuses on discretionary fiscal changes, of both aggregates.
- (4) **Dimension Dummy:** It concentrates on the dimension of the ECT, discriminating between abnormal and normal ECTs. Abnormally dimensioned ECTs are observations that surpass ± 1 Std. Error (=1), while normally dimensioned ECTs are observations within ± 1 Std. Error (=0).
- (5) **Election Dummy:** Predominantly focused on election periods, it signals for each election a five-quarter period. Following the institutional lag assumption, this dummy focuses on the election year and the institutional lag quarter.
- (6) **Trigger-Election Dummy:** Following the construction of the previous variable, it signals elections where there is a shift in the political quadrant of the government.

⁷ Elections in the US take place on the fourth quarter of the election year. The Presidential Inauguration takes place in the after-election quarter. We assume that fiscal aggregates will only respond fully to the newly elected administration on the second quarter after elections.

⁸ Ramey's expenditure episodes are available from 1889:Q4 to 2013:Q4 while Romer and Romer's tax episodes are available from 1945:Q1 to 2007:Q4. The exogenous dummy signals each expenditure and tax episode identified by both authors from 1952:Q1 to 2013:Q4.

5. Estimation

As presented in Section 3, an estimation of a VECM and an underlying cointegration relation between fiscal aggregates is estimated, as it allows an exploration of short and long run dynamics in a multivariate framework. A first step consists on assessing whether the variables have the same order of integration, more specifically if they are $I(1)$, as this is a necessary condition for the existence of cointegration.

As observable in Table 1, from the standard Augmented Dickey-Fuller (ADF), the heteroskedasticity robust Philips Perron (PP) and the efficient unit root statistic, the Elliot, Rothenberg and Stock Test, all unit root tests indicate that both receipts and expenditure are $I(1)$ ⁹. As the integration order condition is satisfied, we proceed on testing for cointegration.

Lütkepohl et al. (2001) identify a higher susceptibility from the trace test to size distortions when dealing with small samples. Aiming to minimize size distortions we focus on the maximum eigenvalue test. Analysing such statistic, the null of no CE relations is rejected with a 5% significance level. On the other hand, the null of at least one relation cannot be rejected at standard levels, this leading us to conclude that US federal receipts and expenditures are cointegrated, exhibiting one CE relation.

In theory, building on an assumption of Gaussian residuals, the Johansen test requires a Test VAR with Gaussian residuals for a valid inference on such statistic. Observing Table 1, the Test VAR exhibits non-normal residuals and a heteroscedastic variance.

In practice, according to Silvapulle and Podivinsky (2000) the Johansen tests are robust to non-normality in finite samples, allowing us to draw conclusions on the test when dealing with non-normal residuals.

⁹ For robustness purposes we test the unit root hypothesis with the Kwiatkowski-Phillips-Schmidt-Shin test (KPSS), a stationary test, the same conclusion arising.

Table 1. Unit Root, Cointegration Tests and Test VAR Adequacy Tests

| | <i>k</i> | <i>ADF</i> | <i>PP</i> | <i>KPSS</i> | <i>ERS</i> |
|--------------|----------|------------|------------|-------------|------------|
| t_t | 2 | -0.834 | -0.702 | 2.004*** | 99.416 |
| Δt_t | 1 | -9.245*** | -15.159*** | 0.035 | 0.296*** |
| g_t | 4 | -0.693 | -0.961 | 1.977*** | 230.0583 |
| Δg_t | 3 | -5.727*** | -18.802*** | 0.118 | 3.905* |

| <i>CE Relations</i> | <i>Eigenvalue</i> | <i>Trace Stat.</i> | <i>P – Value</i> | <i>Max Eigen Stat.</i> | <i>P – Value</i> |
|---------------------|-------------------|--------------------|------------------|------------------------|------------------|
| None | 0.056770 | 14.82668 | 0.0629 | 14.55290 | 0.0450 |
| At most 1 | 0.001099 | 0.273775 | 0.6008 | 0.273775 | 0.6008 |

| | <i>Portmanteau (16)</i> | <i>White</i> | <i>Jarque – Bera</i> |
|----------|-------------------------|-------------------------|-------------------------|
| Test VAR | 30.51420 (0.9388) | 87.53403*** (0.0117) | 353.1383*** (0.0000) |

1. Rejection of Null Hypothesis with 10% (*), 5% (**) and 1% (***) Significance Level.

2. The Elliot, Rothenberg and Stock were performed for both variables with the MAIC Lag Criteria.

3. Considering Receipts, the MAIC is 2 in Levels and 10 in 1st Differences while the SC is 0 and 1 in 1st Differences.

4. Considering Expenditures, the MAIC is 4 in Levels and 4 in 1st Differences while the SC is 4 in Levels and 3 in 1st Differences.

5. The Test VAR is composed by five autoregressive terms, hence it is a VAR(5).

6. The Portmanteau VAR is performed for 16 Lags and refers to the Adjusted Q-Stat.

Focusing on heteroscedasticity, Maki (2013) concentrates on the maximum eigenvalue test and supports the robustness of such test to GARCH processes. ARCH/GARCH processes surge within high-frequency data, where data volatility is persistently variable, thus allowing for consistent volatility modelling. Given the low frequency of the analysed data, the identified heteroscedasticity will follow mild ARCH/GARCH processes, thus the Max. Eigen. Statistic is a valid target for statistical inference.

By confirming the robustness of the derived statistics and hence the validity of the identified cointegration relation, we ensue on estimating a VECM as follows: (1) The ECT, product of the CE relation, is estimated with Full Information MLE, following the Johansen cointegration approach. (2) The ECT is exogenously inserted into the 1st differenced VAR, forming the VECM that is estimated with SUR¹⁰.

¹⁰ Seemingly Unrelated Regressions is used for robustness purposes having in mind heteroscedasticity, the coefficients being estimated with OLS, and the covariance matrix being estimated with GLS.

Concentrating on the ECT, two Error Correction Terms are estimated, this resulting from the asymmetric models estimated forward. Both ECT's and estimated Cointegration Vectors are presented below, both being fittingly similar:

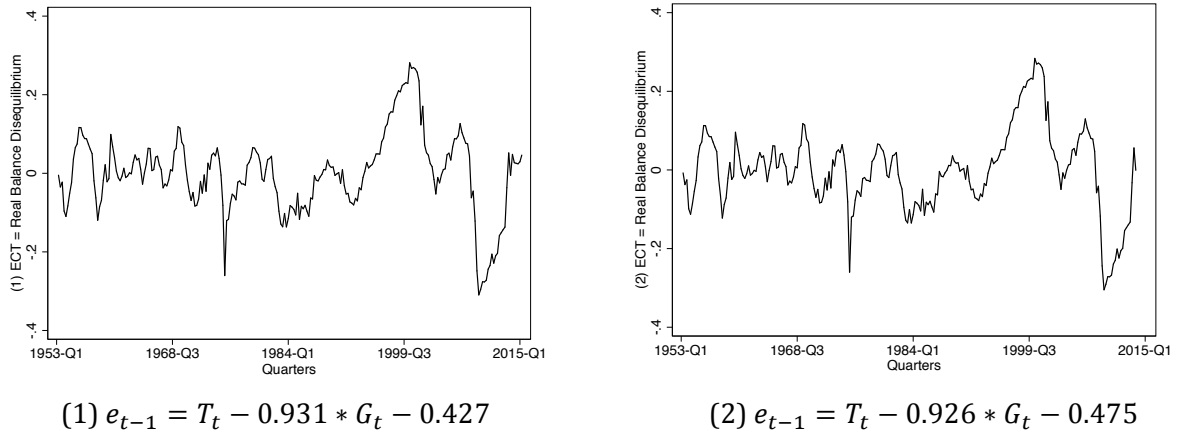


Figure 2. Error Correction Terms, 1953:Q2 to 2015:Q2 and 2013:Q4

6. Results

Our analysis focuses on the adjustment coefficients present in the estimated VECMs, these coefficients indicating the fiscal aggregate's response to budget disequilibria, thus being essential to understand how fiscal aggregates respond to deviations from a sustainable budgetary equilibrium.

Given the specification of the analysed variables, being natural logarithms, the ECT is also denominated in natural logarithms. The adjustment coefficients in each model are thus fiscal elasticities, that is, the percentage change of fiscal aggregates variation to a one-percentage point variation from budget deviations. This allows us to focus on the sign and amplitude of each coefficient for a robust relative analysis of each derived fiscal adjustment parameter.

Assuming that fiscal aggregates react linearly to budget deviations, we find statistically significant adjustment coefficients for both receipts and expenditures. Fiscal balance is thus achieved in the United States with both receipts and expenditure adjusting accordingly to departures from a sustainable budget equilibrium.

Table 2. Linear and Partisan Asymmetric Models

| | | ΔT | ΔG | | | ΔT | ΔG |
|---|-------------|------------------------|-----------------------|---|----------------|------------------------|-----------------------|
| L | ECT_{t-1} | -0.058303* (0.0021) | 0.030689* (0.0119) | P | $D * EC_{t-1}$ | -0.022552 (0.2987) | 0.018569 (0.1914) |
| | | | | | $R * EC_{t-1}$ | -0.137142* (0.0000) | 0.057414* (0.0050) |

- (1) * Signals significant coefficients at least at a 10% Significance Level (P-Values in parenthesis).
(2) ECT meaning Error Correction Term, D meaning Democrats and R meaning Republicans.

Focusing on the Partisan Model (Table 2), differentiating between Democrats and Republicans, we find that only Republicans tend to significantly adjust for budget deviations, the Republican's adjustment coefficients being statistically significant. Adding to this, Republicans tend to be more sensitive than average, with adjustment coefficients and hence adjustment speeds from both fiscal aggregates being higher than the linearly derived.

Lifting the assumption of symmetric fiscal adjustments, we discriminate surplus and deficit budget departures so to capture possible asymmetric fiscal responses, deriving the Sign Model (Table 3). The imposition of sign asymmetry leads us to conclude that fiscal aggregates respond, in general, especially to deficit deviations. As identified in the Linear Model (Table 2), fiscal balance is achieved through a mixed adjustment of fiscal aggregates.

By assuming that Democrats and Republicans react differently to surplus and deficit, we construct the S&P (Sign and Partisan) Model present in Table 3. The S&P Model reinforces the initial result, that Republicans are highly sensitive to budget deviations. Indeed, the S&P Model enriches such result by decomposing this fiscal sensitivity – when dealing

with surplus departures Republicans tend to adjust exclusively through receipts, while with deficits both aggregates are used to adjust for fiscal balance.

Table 3. Sign and Sign/Partisan Asymmetric Models

| | | ΔT | ΔG | | | ΔT | ΔG |
|---|---------------|------------|------------|------------------|------------------|------------|------------|
| S | ECT_{t-1}^+ | 0.009064 | -0.039758 | S & P | $D * EC_{t-1}^+$ | 0.009763 | -0.005322 |
| | | (0.6556) | (0.2080) | | | (0.7749) | (0.8117) |
| | ECT_{t-1}^- | 0.052722* | -0.077198* | | $R * EC_{t-1}^+$ | -0.146949* | 0.033711 |
| | | (0.0106) | (0.0160) | | | (0.0036) | (0.3060) |
| | | | | $D * EC_{t-1}^-$ | -0.051144 | 0.041483* | |
| | | | | | (0.1214) | (0.0551) | |
| | | | | $R * EC_{t-1}^-$ | -0.123888* | 0.084993* | |
| | | | | | (0.0246) | (0.0185) | |

(1) * Signals significant coefficients at least at a 10% Significance Level (P-Values in parenthesis).

(2) EC^+ signalling positive ECTs while EC^- signalling negative ECTs (D meaning Democrats and R meaning Republicans).

Focusing on Democrats, by imposing sign asymmetry these appear to be sensitive to deficitarian budget deviations. The adjustment to fiscal balance is achieved through expenditure.

By comparing the Democrat and Republican response to deficit departures (Figure 3), we are able to conclude that Republicans are much more deficit averse, adjusting significantly through both fiscal aggregates and in a higher proportion than Democrats.

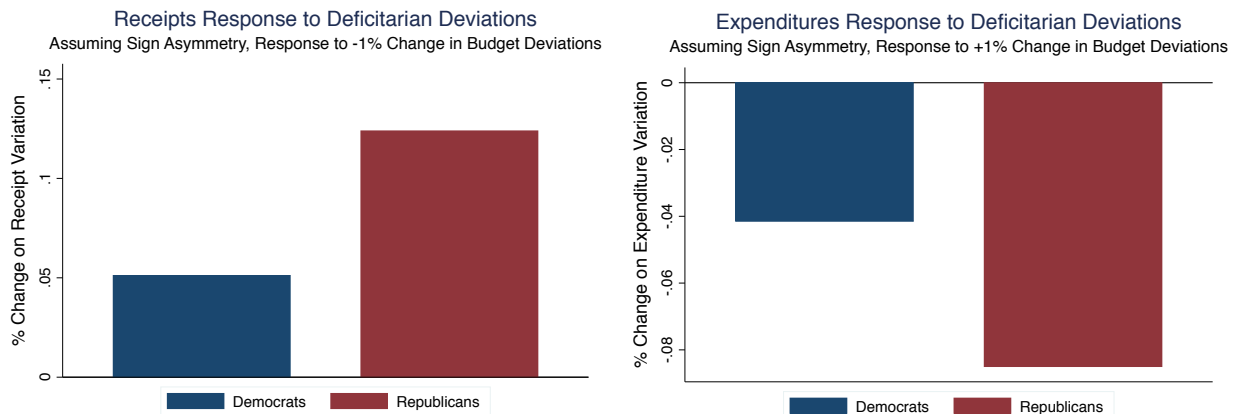


Figure 3. Fiscal Aggregates Response to Deficitarian Deviations

The identified deficit aversion respects the expected *Hibbsian* macroeconomic profile, Republicans pursuing stricter fiscal discipline to achieve low inflation. On the other hand, the

line of adjustment for fiscal balance by both parties does not follow theory. Republicans appear to adjust deficit deviations primarily by taxation, hence increasing the extractive dimension of the State. Democrats adjust deficit by expenditure, counter-acting the theoretical and empirically advocated relation with increasing public spending.

Following the empirically advocated soft budget constraint, assuming that fiscal aggregates will react differently to budget disequilibria depending on its dimension, the Dimension Model (Table 4) is estimated. According to this model, both fiscal aggregates adjust significantly uniquely to uncommonly large deviations, suggesting that indeed fiscal aggregates in the United States follow a soft budget constraint.

Table 4. Dimension and Dimension/Partisan Asymmetric Models

| ΔT | | | ΔG | | | ΔT | | | ΔG | | |
|------------|------------------|------------|------------|----------------------|----------------------|------------|-----------|--|------------|--|--|
| D | ECT_{t-1}^{Un} | -0.057928* | 0.025993* | D & P | $D * ECT_{t-1}^{Un}$ | -0.017502 | 0.015370 | | | | |
| | | (0.0044) | (0.0467) | | | (0.4198) | (0.2865) | | | | |
| | ECT_{t-1}^{Us} | -0.060217 | 0.054655* | | $R * ECT_{t-1}^{Un}$ | -0.207814* | 0.065780* | | | | |
| | | (0.1548) | (0.0453) | | | (0.0000) | (0.0131) | | | | |
| | | | | $D * ECT_{t-1}^{Us}$ | -0.140104 | 0.089124 | | | | | |
| | | | | | (0.1246) | (0.1415) | | | | | |
| | | | | | $R * ECT_{t-1}^{Us}$ | -0.048680 | 0.048502 | | | | |
| | | | | | (0.2790) | (0.1048) | | | | | |

- (1) * Signals significant coefficients at least at a 10% Significance Level (P-Values in parenthesis).
(2) EC^{Un} signalling ECTs which surpass ± 1 Std. Error while EC^{Us} signalling ECTs within a ± 1 Std. Error interval (D meaning Democrats and R meaning Republicans).

When the Dimension Model is expanded with partisan sensitivity, we conclude that such soft budget constraint is entirely driven by Republicans. Indeed, through the D&P Model we are able to characterize the Republican fiscal dynamic as a soft budget constraint, that is, fiscal aggregates reacting significantly to abnormally dimensioned budget deviations.

Assuming fiscal aggregates respond differently to budget disequilibria depending on the character of such response, if it is automatic or discretionarily set, we make use of the fiscal multipliers narrative approach to discriminate between endogenous and exogenous fiscal responses, constructing the Exogeneity Model (Table 5).

Table 5. Exogeneity and Exogeneity/Partisan Asymmetric Models

| | | ΔT | ΔG | | | ΔT | ΔG |
|---|------------------|------------|------------|-------------|---------------------|------------|------------|
| E | ECT_{t-1}^{Ex} | -0.125727* | 0.067491* | E & P | $D * EC_{t-1}^{Ex}$ | -0.009168 | 0.064169* |
| | | (0.0005) | (0.0037) | | | (0.8558) | (0.0537) |
| | ECT_{t-1}^{En} | -0.35748 | 0.018502 | | $R * EC_{t-1}^{Ex}$ | -0.238967* | 0.071122* |
| | | (0.1030) | (0.1904) | | | (0.0000) | (0.0297) |
| | ECT_{t-1}^{Ex} | -0.125727* | 0.067491* | | $D * EC_{t-1}^{En}$ | -0.024343 | 0.008125 |
| | | (0.0005) | (0.0037) | | | (0.3150) | (0.6101) |
| | ECT_{t-1}^{En} | -0.35748 | 0.018502 | | $R * EC_{t-1}^{En}$ | -0.077792* | 0.048694* |
| | | (0.1030) | (0.1904) | | | (0.0471) | (0.0588) |

(3) * Signals significant coefficients at least at a 10% Significance Level (P-Values in parenthesis).

(4) EC^{Ex} signalling ECTs which are discretionarily countered while EC^{En} signalling ECTs which are automatically countered (D meaning Democrats and R meaning Republicans).

According to the derived adjustment coefficients, fiscal aggregates adjustment to budget deviations is solely significant when discretionarily imposed. When incorporating partisan asymmetries, the previously identified Republican sensitivity is accentuated.

The initial result that Republicans tend to be more sensitive to budget deviations is thus robust, the identified fiscal sensitivity by Republicans expanding in significance and aspect with each analysis extension, as noticeable in Figure 4. Republicans thus tend to be more sensitive to budget deviations, such sensitivity being discretionarily imposed and focusing on abnormally dimensioned disequilibria.

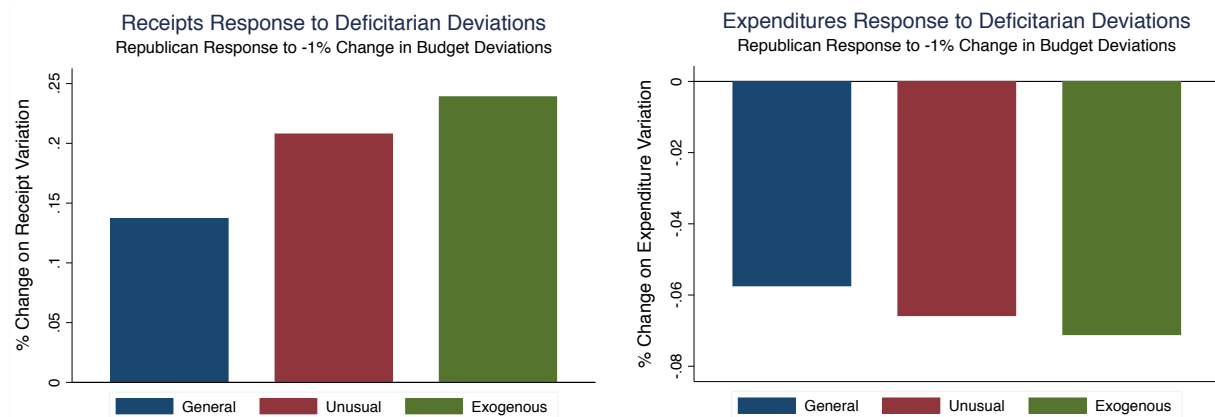


Figure 4. Republican Fiscal Aggregates Responses to Budget Disequilibria

Assuming political players will respond differently to budget disequilibria in elections, we construct the Election Model (Table 6). Subsequently, by investigating strategic

behaviours when re-election is not imminent, the Trigger-Election Model (Table 7) is constructed.

Table 6. Elections and Elections/Partisan Asymmetric Models

| | | ΔT | ΔG | | | ΔT | ΔG |
|--------|-------------------|------------------------|-----------------------|------------------|----------------------|------------------------|-----------------------|
| E L | ECT_{t-1}^{Ele} | -0.036078 (0.2723) | 0.030299 (0.1540) | E L & P | $D^{Ele} * EC_{t-1}$ | -0.023432 (0.5399) | 0.007271 (0.7715) |
| | | | | | $R^{Ele} * EC_{t-1}$ | -0.072732 (0.2438) | 0.090637* (0.0269) |
| | ECT_{t-1}^{NE} | -0.068147* (0.0023) | 0.030861* (0.0325) | | $D^{NE} * EC_{t-1}$ | -0.023003 (0.3784) | 0.023379 (0.1720) |
| | | | | | $R^{NE} * EC_{t-1}$ | -0.156991* (0.0000) | 0.047876* (0.0386) |

- (1) * Signals significant coefficients at least at a 10% Significance Level (P-Values in parenthesis).
(2) EC^{Ele} signalling ECTs within Election Periods while EC^{NE} signalling ECTs within General Periods (D meaning Democrats and R meaning Republicans).

Examining both models, fiscal aggregates do not respond significantly to budget disequilibria in elections periods. When expanding such models with partisan asymmetries, Republicans are particularly sensitive to budget departures when in election periods.

Table 7. Trigger-Elections and Trigger-Elections/Partisan Asymmetric Models

| | | ΔT | ΔG | | | ΔT | ΔG |
|--------|--------------------|------------------------|-----------------------|------------------|-----------------------|------------------------|-----------------------|
| T E | ECT_{t-1}^{TEle} | 0.002266 (0.9568) | 0.022136 (0.4148) | T E & P | $D^{TEle} * EC_{t-1}$ | -0.005308 (0.9084) | -0.009484 (0.7537) |
| | | | | | $R^{TEle} * EC_{t-1}$ | 0.020652 (0.8193) | 0.143567* (0.0156) |
| | ECT_{t-1}^{NTE} | -0.071544* (0.0005) | 0.032559* (0.0144) | | $D^{NTE} * EC_{t-1}$ | -0.027071 (0.2616) | 0.026036* (0.0996) |
| | | | | | $R^{NTE} * EC_{t-1}$ | -0.155093* (0.0000) | 0.048289* (0.0230) |

- (1) * Signals significant coefficients at least at a 10% Significance Level (P-Values in parenthesis).
(2) EC^{TEle} signalling ECTs within Trigger- Election Periods while EC^{NTE} signalling ECTs within General Periods (D meaning Democrats and R meaning Republicans).

To understand if Republicans tend to be more sensitive to deficit or surplus when in elections, the assumption of sign symmetry is lifted for both models (Table 8). Analysing the consequent models, we discern a clear electoral sensitivity to surplus deviations. In general Republicans are particularly sensitive to surplus departures when facing elections, expenditure being expanded above average. This electoral increase in expenditure seems to be directly linked with re-election motivations, an opportunistic behaviour being captured.

Table 8. Election and Trigger/Sign/Partisan Asymmetric Model

| ΔT | | | ΔG | | | ΔT | | | ΔG | | |
|---------------------------------|------------------------|------------------------|------------|-----------------------|--|-------------------------|------------------------|--|-----------------------|--|--|
| E & L & S & P | $D * EC_{t-1}^+$ | 0.012263 (0.7858) | | 0.010446 (0.7212) | | $D * EC_{t-1}^+$ | 0.015152 (0.7279) | | 0.004796 (0.8680) | | |
| | $D^{Ele} * EC_{t-1}^+$ | 0.009764 (0.8301) | | -0.018433 (0.5323) | | $D^{TEle} * EC_{t-1}^+$ | 0.002978 (0.9485) | | -0.014789 (0.6282) | | |
| | $R * EC_{t-1}^+$ | -0.158684* (0.0033) | | 0.006628 (0.8490) | | $R * EC_{t-1}^+$ | -0.134509* (0.0079) | | 0.022072 (0.5092) | | |
| | $R^{Ele} * EC_{t-1}^+$ | -0.089152 (0.3968) | | 0.164455* (0.0163) | | $R^{TEle} * EC_{t-1}^+$ | -0.318551* (0.0777) | | 0.270345* (0.0240) | | |
| | $D * EC_{t-1}^-$ | -0.041439 (0.2368) | | 0.034324 (0.1310) | | $D * EC_{t-1}^-$ | -0.052359 (0.1061) | | 0.040101* (0.0618) | | |
| | $D^{Ele} * EC_{t-1}^-$ | -0.117071 (0.1427) | | 0.080434 (0.1206) | | $D^{TEle} * EC_{t-1}^-$ | -1.416928 (0.1135) | | 0.330383 (0.5771) | | |
| | $R * EC_{t-1}^-$ | -0.151913* (0.0143) | | 0.098390* (0.0144) | | $R * EC_{t-1}^-$ | -0.178687* (0.0017) | | 0.078632* (0.0370) | | |
| | $R^{Ele} * EC_{t-1}^-$ | -0.061985 (0.4602) | | 0.052300 (0.3368) | | $R^{TEle} * EC_{t-1}^-$ | 0.120974 (0.2620) | | 0.112586 (0.1153) | | |

(1) * Signals significant coefficients at least at a 10% Significance Level (P-Values in parenthesis).

When facing trigger-elections, Republicans respond to surplus deviations with both fiscal aggregates, increasing expenditure and decreasing taxation¹¹. The response to surplus departures is again higher than average (Figure 5), fiscal deficit being abnormally expanded. Assuming Republicans comprehend beforehand on a future Democrat victory, such atypical deficit expansion may have strategic motivations. Following Persson and Svensson (1989), Republicans appear to deliberately expand deficit so to limit future Democrat fiscal policy.

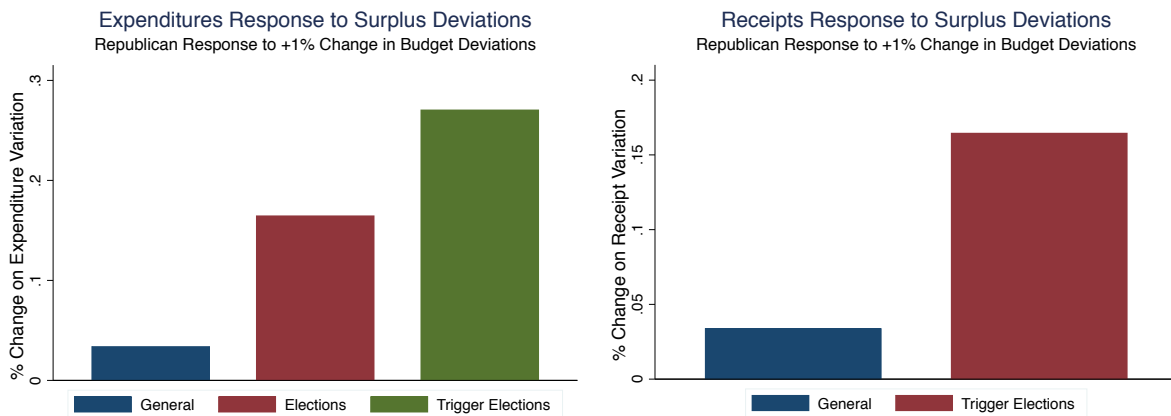


Figure 5. Fiscal Aggregates Responses to Surplus Deviations

¹¹ Republican trigger-elections are independent from military buildups, the robustness of such result being attested. On the other hand, the derived general electoral effect can be partially driven by the Carter-Reagan Buildup. (See Technical Appendix, Figure 1).

7. Conclusion

Analysing the US fiscal dynamics from an asymmetric framework, by distinguishing between Democrats and Republicans, we empirically examine fiscal aggregates responses to budget disequilibria to understand how is fiscal balance achieved in the United States and if such achievement is influenced by political factors.

On a first note, we identify the political quadrant of the federal government as an acting determinant in the US fiscal dynamics. Indeed, Republicans comparing with Democrats tend to pursue stricter fiscal discipline, as advocated theoretically by Hibbs (1977). Such fiscal discipline is characterized by a significant deficit aversion. Focusing on the attainment of fiscal balance when dealing with unsustainable deficit deviations, Republicans tend to adjust through policy mixes, regulating both fiscal aggregates. Democrats on the other hand appear to adjust primarily through expenditure.

On a second note, by decomposing both budget deviations and fiscal responses we are able to attest the robustness of the initial conclusion, that is, that Republicans pursue a stricter fiscal balance.

Discriminating budget imbalances by dimension, we are able to attest the presence of a soft budget constraint in the United States, fiscal aggregates being significantly sensitive to abnormal budgetary deviations. When assuming politically motivated asymmetries, we determine that Republicans drive such soft budget constraint.

By distinguishing fiscal responses as automatic and discretionary, making use of the fiscal multipliers narrative approach, we identify an accentuation of the Republican fiscal discipline when concentrating on discretionarily imposed fiscal responses. We thus conclude on the discretionary character of the identified Republican fiscal discipline.

Finally, by exploring the timing of election, we identify a changing fiscal dynamic directly influenced by the election cycle. Indeed, when facing surplus departures in election

periods Republicans tend to expand expenditure above average, following Nordhaus (1975). On the other hand, when dealing with trigger-elections, Republicans tend to increase expenditure and decrease taxation at an abnormal rate, instilling atypical deficitarian pressures over the fiscal budget. This abnormal electoral behaviour seems to follow Persson and Svensson (1989), appearing to have strategic motivations. Fiscal policy thus appears to be utilized not only as an economic but also as a political instrument by policymakers in the United States.

Concentrating on the recovery of fiscal balance in the United States, we thus empirically identify political factors such as the federal government's political quadrant and the election cycle as significant determinants over a non-linear fiscal dynamic. Such an empirical linkage is an addition to literature on US fiscal policy, allowing for a more detailed knowledge of fiscal dynamics and balance attainment. An incorporation of political asymmetries in a macroeconometric framework expanded by a narrative approach is also an addition to the US fiscal policy literature.

For future research, a discrimination of the budgetary disequilibria origin would allow for an exhaustive analysis over fiscal dynamics. Also, an exploration of fiscal multipliers within a political perspective would be of interest, that is, if fiscal aggregates affect differently the economy depending on the political quadrant of the government. Recurring to non-linear techniques such as TAR and MTAR, as in Arestis et al (2004), Ewing et al (2006) and Cipollini et al (2009) would allow the derivation of the Impulse Response Functions for Democrats and Republicans, both fiscal and product-wise.

References

- Alesina, Alberto, and Guido Tabellini. 1990. "A Positive Theory of Fiscal Deficits and Government Debt." *The Review of Economic Studies* 57(3): 403–14.
- Arestis, Philip, Andrea Cipollini, and Bassam Fattouh. 2004. "Threshold Effects in the U.S. Budget Deficit." *Economic Inquiry* 42(2): 214–22.
- Barro, Robert J. 1979. "On the Determination of the Public Debt." *Journal of Political Economy* 87(5): 940.
- Buchanan, J. M., and R. W. Wagner. 1977. "Democracy in deficit: The political legacy of Lord Keynes". *New York: Academic Press*.
- Burnside, Craig, Martin Eichenbaum, and Jonas D.M. Fisher. 2004. "Fiscal Shocks and Their Consequences." *Journal of Economic Theory* 115(1): 89–117.
- Cameron, David R. 1978. "The Expansion of the Public Economy: A Comparative Analysis." *American Political Science Review* 72(04): 1243–61.
- Cipollini, Andrea, Bassam Fattouh, and Kostas Mouratidis. 2009. "Fiscal Readjustments in the United States: A Nonlinear Time-Series Analysis." *Economic Inquiry* 47(1): 34–54.
- Edelberg, Wendy, Martin Eichenbaum, and Jonas D.M. Fisher. 1999. "Understanding the Effects of a Shock to Government Purchases." *Review of Economic Dynamics* 2(1): 166–206.
- Ewing, Bradley T, James E Payne, Mark A Thompson, and Omar M Al-zoubi. 2006. "Government Expenditures from Asymmetric Evidence and Revenues : Modeling." *Southern Economic Journal* 73(1): 190–200.
- Friedman, M. 1978. "The limitations of tax limitation". *Policy Review* (Summer): 7-14.
- Hibbs, Douglas A. Jr. 1977. "Political Parties and Macroeconomic Policy." *The American Political Science Review* (4): 1467–87.
- Johansen, Soren. 1991. "Estimation And Hypothesis Testing Of Cointegration Vectors In Gaussian Vector Autoregressive Models." *Econometrica* 59(6): 1551–80.
- Kollias, Christos, Stephanos Papadamou, and Iacovos Psarianos. 2014. "Fiscal Imbalances and Asymmetric Adjustment under Labour and Conservative Governments in the UK." *Research in Economics* 68(3): 208–13.
- Legrenzi, Gabriella, and Costas Milas. 2012. "Nonlinearities and the Sustainability of the Government's Intertemporal Budget Constraint." *Economic Inquiry* 50(4): 988–99.
- Lütkepohl, Helmut, Pentti Saikkonen, and Carsten Trenkler. 2001. "Maximum Eigenvalue versus Trace Tests for the Cointegrating Rank of a VAR Process." *The Econometrics Journal* 4(2): 287–310.

- Maki, Daiki. 2013. "The Influence of Heteroskedastic Variances on Cointegration Tests: A Comparison Using Monte Carlo Simulations." *Computational Statistics* 28(1): 179–98.
- Mulas-Granados, Carlos. 2003. "The Political and Economic Determinants of Budgetary Consolidation in Europe." *European Economic Review* 1(1): 15–39.
- Nordhaus, William D. 1975. "The Political Business Cycle." *The Review of Economic Studies* 42(2): 169–90.
- Payne, James E. 2003. "A Survey of the International Empirical." *Public Finance Review* 31(3): 302–24.
- Persson, Torsten, and Lars E. O. Svensson. 1989. "Why a Stubborn Conservative Would Run a Deficit : Policy with Time- Inconsistent Preferences." *The Quarterly Journal of Economics* 104(2): 325–45.
- Quintos, Carmela E. 1995. "Sustainability of the Deficit Process with Structural Shifts." *Journal of Business & Economic Statistics* 13(4): 409–17.
- Ramey, Valerie a. 2011. "Identifying Government Spending Shocks: It's All in the Timing." *The Quarterly Journal of Economics* 126(1): 1–50.
- Ramey, Valerie A., and Matthew D. Shapiro. 1998. "Costly Capital Reallocation and the Effects of Government Spending." *Carnegie-Rochester Conference Series on Public Policy* 48: 195–209.
- Romer, Christina D, and David H Romer. 2010. "The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks." *American Economic Review* 100(3): 763–801.
- Silvapulle, Param Sothy, and Jan M Podivinsky. 2000. "The Effect of Non-Normal Disturbances and Conditional Heteroskedasticity on Multiple Cointegration Tests." *Journal of Statistical Computation and Simulation* 65(1-4): 173–89.
- Tavares, José. 2004. "Does Right or Left Matter? Cabinets, Credibility and Fiscal Adjustments." *Journal of Public Economics* 88(12): 2447–68.
- Volkerink, Bjorn, and J De Haan. 2001. "Fragmented Government Effects on Fiscal Policy: New Evidence." *Public Choice* 109(3): 221–42.
- Wildavsky, A. 1988. "The newpolitics of the budgetary process". *Glenview, IL: Scott, Foresman*.
- Young, Andrew T. 2011. "Do US Federal Revenues and Expenditures Respond Asymmetrically to Budgetary Disequilibria?" *Applied Economics Letters* 18(8): 749–52.